

REMARKS

The Examiner is thanked for the thorough examination of the present application and the indication that claims 3, 4, 8, 10, 12, 14, 31, 32, 36, 38, 40, and 42 contain allowable subject matter. Claims 1, 12, and 29 have been amended herein.

Specifically, Applicant has amended independent claims 1 and 29 to more clearly identify how the alloy contains the metals with proper Markush groupings. Support for this amendment can be found on from page 4, line 26 to page 7, line 24 of the application. Accordingly, the amendment adds no new matter to the application, and Applicant submits that independent claims 1 and 29 (and therefore all claims) patentably define over the cited art.

Applicant has also amended claim 12 to correct the dependency recited therein, from claim 11 to claim 1.

35 U.S.C. 112

Claims 1-59 stand rejected under 35 U.S.C 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In response, claims 1 and 29 have been amended to reflect proper Markush groupings. Claim 12 has been amended to depend from claim 1, which provides the antecedent basis for Ti. Thus, this rejections under 35 U.S.C 112 have been properly addressed and overcome.

35 U.S.C. 103(a)

Claims 1, 2, 7, 9, 11, 13, 15, 18-21, 22-30, 35, 37, 39, 41, 43, 46, and 49-59 stand rejected under 35 U.S.C. 103(a) as allegedly unpatentable over Umetani et al. (US 5,171,348) in view of

Hagerty et al. (US 4,747,864), Epstein et al. (US 5,932,940), Taniguchi et al. (US 5,676,723), Monji et al. (US 4,721,518), Bai et al. (TW 445242), and Hibino et al. (US 6,119,485). Claims 5-6, 16-17, 33-34, 44-45, and 47-48 stand rejected under 35 U.S.C. 103(a) as allegedly unpatentable over Umetani et al. in view of Epstein et al. Applicant respectfully traverses the rejections for the reasons discussed below.

Significantly, none of the prior art references teach or suggest the claimed features of:

a first intermediate layer of Ni-containing Ir-Re alloy overlying the substrate, with Ni concentration decreasing with distance from the substrate/first intermediate layer interface;

an intermediate buffer layer of Ir-Re alloy overlying the substrate; and

a second intermediate layer of metal-containing Ir-Re alloy overlying the intermediate buffer layer, the metal comprising Cr, Ta, Ti, or Ti-Cr alloy, in concentration increasing with distance from the intermediate buffer layer/second intermediate layer interface.

Umetani et al. appears to disclose a substrate of WC and an intermediate layer of Ni-containing an alloy overlying the substrate (as alleged by the Office Action). However, the Office Action admitted that Umetani et al. disclose a surface protective layer selected from a group consisting of Pt, Pd, Ir, Rh, Os, Ru, Re, W, and Ta, and especially selected from a group consisting of Ir-W, Ru-W, Ir-Ta, Ru-W, Ru-Ta, Ir-Re, and Ru-Re alloy. Significantly, Umetani fails to clearly disclose “a intermediate layer comprising Ta-containing Ir-Re alloy” in Col. 4, lines 9-15. The Office Action further alleges that Umetani et al. mention the use of Ir-Re because of its thermal and chemical stability at high temperature. However, the Office Action noted and acknowledged that this is why Ir-Re is used as the surface protective layer, BUT NOT the intermediate layer. (See Umetani et al. at Col. 3, lines 35-39, especially the “a surface protective layer made of...” in line 35).

Umetani et al. further disclose a base material 51, a thin film 52 on the base material 51 for enforcing the adhesion strength between the base material 51 and an intermediate layer 53 thereon, and a surface protective layer 54 on the intermediate layer 53. The base material 51 is composed of TiN, TiC, Al₂O₃, Cr₃O₂, or WC. The thin film 52 is Ni-Co alloy. The intermediate layer 53 is Pt, Au, Cu, Ni, or Pt-Au, Pt-Cu, Pt-Ni, Ni-P, or Ni-B alloy. The surface protective layer 54 is Pt-Rh-Re-W alloy. (See Umetani et al. at Col. 11, lines 5-35 and Fig. 5.) Umetani et al. further teach a gold, copper, nickel or platinum-gold, platinum-copper, or platinum-nickel alloy thin film with the platinum content of 60 wt.% or less excellent in cutting processability and grinding processability is formed on the base material as the intermediate layer. (See Umetani et al. at Col. 2, lines 21-26.)

Importantly, there is no teaching in Umetani et al. to form an intermediate layer comprising Ir-Re alloy containing metal, as specified in the independent claims. The only platinum-containing alloy described Umetani et al. acts as the intermediate layer. An intermediate layer comprising Ir-Re alloy-containing metal is not contemplated by Umetani et al. Further, one of ordinary skill in the art would not have been motivated to form an intermediate layer comprising Ir-Re alloy containing metal by the teachings of Umetani et al. Instead, the teachings of Umetani et al. would lead one to form platinum-containing alloy acting as the intermediate layer. For at least this reason, the rejections of the independent claims should be withdrawn.

In addition, Hagerty et al. appears to teach a nickel layer as an intermediate layer between a base mold and a protective coating because nickel allows for easy precision-machining into desired shape. Like Umetani, Hagerty fails to teach an intermediate layer comprising Ir-Re alloy containing metal of the claimed invention. One of ordinary skill in the art would not have been

motivated to form an intermediate layer comprising Ir-Re alloy containing metal by combination of the teachings of Umetani et al and Hagerty et al.

Likewise, Epstein et al. discloses the use of Ni, Ir, Re alloys because of their strength and oxidation resistance, as asserted by the Office Action. However, these properties match the need for the surface protective layer taught by Umetani et al. One of ordinary skill in the art would not have been motivated to form an intermediate layer comprising Ir-Re alloy containing metal by combination of the teachings of Umetani et al and Epstein et al.

For at least the foregoing reasons, Applicant respectfully submits that the cited references of Umetani et al., Hagerty et al., and Epstein et al., either alone or in combination, fail to disclose or render obvious the feature of the claimed embodiments discussed above, and as expressly defined in independent claims 1 and 29.

Turning to the other cited references, Taniguchi et al. teach a mold base and an intermediate layer at the surface of the mold base with a mix layer consisting of carbon and at least an element constituting the intermediate layer. The concentration of carbon atoms increases toward the surface and decreases toward the intermediate layer. Taniguchi et al. further teach if the atomic percentage of carbon at the surface is sufficiently high, there is achieved satisfactory releasing property from glass, and a precipitate will not be formed resulting from the reaction with glass. Thus, the mask layer with varying carbon concentration acts as a surface protective layer.

Independent claims 1 and 29 recite intermediate layers of metal-containing Ir-Re alloy overlying the substrate, with varying metal concentration. This unique feature is to improve adhesion of layers overlying the substrate, thereby increasing the lifetime of the resulting molding

die. (See specification page 8, lines 1-14.) Taniguchi et al., however, teach a mask layer of varying carbon concentration to achieve satisfactory releasing property from glass.

As described, none of the teachings of Umetani et al., Hagerty et al., Epstein et al., or Taniguchi et al. teaches intermediate layers of metal-containing Ir-Re alloy overlying the substrate, with varying metal concentration to improve adhesion of layers overlying the substrate. Especially, Taniguchi et al. teach a mask layer of varying carbon concentration to achieve satisfactory releasing property from glass. Therefore, the cited references FAIL to suggest the desirability of the claimed combination, and thus, DO NOT suggest or motivate those skilled in the art to combine the teachings of Taniguchi et al. with Umetani et al.

The examiner is reminded that to establish a prima facie case of obviousness, three criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teaching. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. See MPEP 2142. The applicant submits that the Examiner has failed to satisfy these criteria in asserting that the rejected Claims are obvious in view of Umetani et al. combined with Hagerty et al., Epstein et al., and Taniguchi et al.

The Examiner is further reminded that “in order to rely on a reference as a basis for rejection of an Applicant’s invention, the reference must either be in the field of Applicant’s endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned.” See MPEP 2141.01(a) *citing In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992). The Examiner is still further reminded that “the mere fact that references can be combined

or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.” See MPEP 2143.01 *citing In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). The Examiner is also reminded that “the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant’s disclosure.” See MPEP 2143 *citing In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). The Applicant submits that motivation to combine Taniguchi et al. with Umetani et al. is provided by the Applicant’s disclosure, and not by the prior art.

Further, Bai et al. appears to teach a molding die using a buffer layer increasing adhesion between layers. Significantly, Bai et al fails to disclose intermediate layers of metal-containing Ir-Re alloy overlying the substrate, with varying metal concentration. As Umetani et al. disclose platinum-containing alloy acting as the intermediate layer excellent in cutting processability and grinding processability, there is no motivation for one of ordinary skill in the art to combine the teachings of Bai et al. with Umetani et al. because they fail to properly suggest the desirability of the combination.

Furthermore, Monji et al. teach two or more intermediate layers to improve the effect preventing the diffusion of the active metal, and at the same time adhesion to the base member and the noble metal layer can be strengthened in Col 2, lines 26-30. Monji et al. further teach two intermediate layers are more excellent than a single intermediate layer in preventing Co contained in the base member from precipitating onto mold surfaces in Col. 13, lines 51-68, and disclose the durability would be further enhanced by providing two or more intermediate layer. As described, Monji et al. teach adhesion between intermediate layers and the base member is achieved by preventing the diffusion of the active metal, but FAIL to teach or suggest improving adhesion between intermediate layers.

As Umetani et al. disclose platinum-containing alloy acting as the intermediate layer excellent in cutting processability and grinding processability, there is no motivation for one of ordinary skill in the art to combine the teachings of Monji et al. with Umetani et al. because they FAIL to suggest the desirability of the combination.

In addition, Monji et al. fail to teach intermediate layers of metal-containing Ir-Re alloy overlying the substrate, with varying metal concentration. Moreover, Hibino et al. appears to teach the intermediate layer comprises a component that is included in the base material and a component that is included in the protective layer. However, Hibino et al. teach a protective layer, NOT an intermediate layer, comprising at least one metal film of the group consisting of W, Pt, Pd, Rh, Ru, Ir, Os, Re, Ta, and alloys thereof, and the intermediate layer comprising at least one aluminum compound selected from the group consisting of aluminum oxide and aluminum nitride with a component of the protective layer (see Col 3, lines 21-30). Hibino et al. further teach the intermediate layer comprising at least one material selected from the group consisting of Ti, V, Cr, Zr, Nb, Mo, Hf, Ta, W, and alloys thereof. As described, Hibino et al. still fail to teach the intermediate layers of metal-containing Ir-Re alloy overlying the substrate, with varying metal concentration.

In addition, Taniguchi et al. teach a mask layer of varying carbon concentration to achieve satisfactory releasing property from glass, NOT matching the teachings of Umetani et al., Hagerty et al., Epstein et al., Bai et al., Monji et al., and Hibino et al. As these cited references fail to suggest the desirability of the combination, and thus, do not suggest or motivate those skilled in the art to combine the teachings of Taniguchi et al. with either Umetani et al., Hagerty et al., Epstein et al., Bai et al., Monji et al., and Hibino et al. with any kind of combination.

Accordingly, Applicant respectfully submits that the cited references, either alone or in combination, fail to disclose or render obvious the feature of the above-discussed present invention as set forth in claims 1 and 29.

As neither of these cited references, when taken alone or in combination, teaches or suggests the intermediate layers of metal-containing Ir-Re alloy overlying the substrate, with varying metal concentration of claims 1 and 29, claims 1 and 29 are allowable over the cited references. Insofar as claims 2-28 and 30-59 depend from claims 1 and 29, these claims are also allowable.

As a separate and independent basis for the patentability of claims 1 and 29 (and therefore all claims), Applicant respectfully submits that the Office Action has failed to cite a proper motivation or suggestion for combining the various references. In rejecting independent claims 1 and 29, the Office Action relied on a relatively tenuous combination of references. In combining these references, the Office Action stated that the combinations would have been obvious:

- (1) "to allow for easy precision matching and chemical and thermal strength" (Office Action, p. 4);
- (2) "to prevent peeling of the layers when subject to thermal stress" (Office Action, p. 4);
- (3) "to prevent reactivity with glass in the molding process and to prevent diffusion of metals and strengthen adhesion" (Office Action, p. 5);
- (4) "to have proper adhesion of the first and second intermediate layers" (Office Action, p. 5);

- (5) "to allow for cost-effective manufacturing of a molding die that has easy precision machining, strength, and chemical stability with glass" (Office Action, p. 6); and
- (6) "to ensure proper bond strength among the intermediate layers and to maintain a smooth surface on the passivation film." (Office Action, p. 6)

Each of these allegations were relied upon by the Office Action in order to form the rejections, and clearly these fail to comply with well-established Federal Circuit precedent for rejections under 35 U.S.C. § 103(a).

It is well-settled law that in order to properly support an obviousness rejection under 35 U.S.C. § 103, there must have been some teaching in the prior art to suggest to one skilled in the art that the claimed invention would have been obvious. W. L. Gore & Associates, Inc. v. Garlock Thomas, Inc., 721 F.2d 1540, 1551 (Fed. Cir. 1983). More significantly,

"The consistent criteria for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that this [invention] should be carried out and would have a reasonable likelihood of success, viewed in light of the prior art. ..." Both the suggestion and the expectation of success must be founded in the prior art, not in the applicant's disclosure... In determining whether such a suggestion can fairly be gleaned from the prior art, the full field of the invention must be considered; for the person of ordinary skill in the art is charged with knowledge of the entire body of technological literature, including that which might lead away from the claimed invention."

(Emphasis added.) In re Dow Chemical Company, 837 F.2d 469, 473 (Fed. Cir. 1988).

In this regard, Applicant notes that there must not only be a suggestion to combine the functional or operational aspects of the combined references, but that the Federal Circuit also requires the prior art to suggest both the combination of elements and the structure resulting from the combination. Stiftung v. Renishaw PLC, 945 Fed.2d 1173 (Fed. Cir. 1991). Therefore, in order to sustain an obviousness rejection based upon a combination of any two or more prior art references,

the prior art must properly suggest the desirability of combining the particular elements to derive a glass molding die, as claimed by the Applicant.

When an obviousness determination is based on multiple prior art references, there must be a showing of some “teaching, suggestion, or reason” to combine the references. Gambro Lundia AB v. Baxter Healthcare Corp., 110 F.3d 1573, 1579, 42 USPQ2d 1378, 1383 (Fed. Cir. 1997) (also noting that the “absence of such a suggestion to combine is dispositive in an obviousness determination”).

Evidence of a suggestion, teaching, or motivation to combine prior art references may flow, inter alia, from the references themselves, the knowledge of one of ordinary skill in the art, or from the nature of the problem to be solved. See In re Dembiczak, 175 F.3d 994, 1000, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999). Although a reference need not expressly teach that the disclosure contained therein should be combined with another, the showing of combinability, in whatever form, must nevertheless be “clear and particular.” Dembiczak, 175 F.3d at 999, 50 USPQ2d at 1617.

If there was no motivation or suggestion to combine selective teachings from multiple prior art references, one of ordinary skill in the art would not have viewed the present invention as obvious. See In re Dance, 160 F.3d 1339, 1343, 48 USPQ2d 1635, 1637 (Fed. Cir. 1998); Gambro Lundia AB, 110 F.3d at 1579, 42 USPQ2d at 1383 (“The absence of such a suggestion to combine is dispositive in an obviousness determination.”).

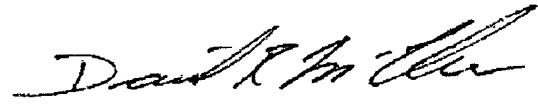
Significantly, where there is no apparent disadvantage present in a particular prior art reference, then generally there can be no motivation to combine the teaching of another reference with the particular prior art reference. Winner Int'l Royalty Corp. v. Wang, No 98-1553 (Fed. Cir. January 27, 2000).

For at least this additional reason that the Office Action failed to identify proper motivations or suggestions for combining the various references to properly support the rejections under 35 U.S.C. § 103, the rejection of claims 1 and 29 should be withdrawn.

No fee is believed to be due in connection with this amendment and response. If, however, any fee is deemed to be payable, you are hereby authorized to charge any such fee to Deposit Account No. 20-0778.

Respectfully submitted,

By:



Daniel R. McClure, Reg. No. 38,962

Thomas, Kayden, Horstemeyer & Risley, LLP
100 Galleria Pkwy, NW
Suite 1750
Atlanta, GA 30339
770-933-9500